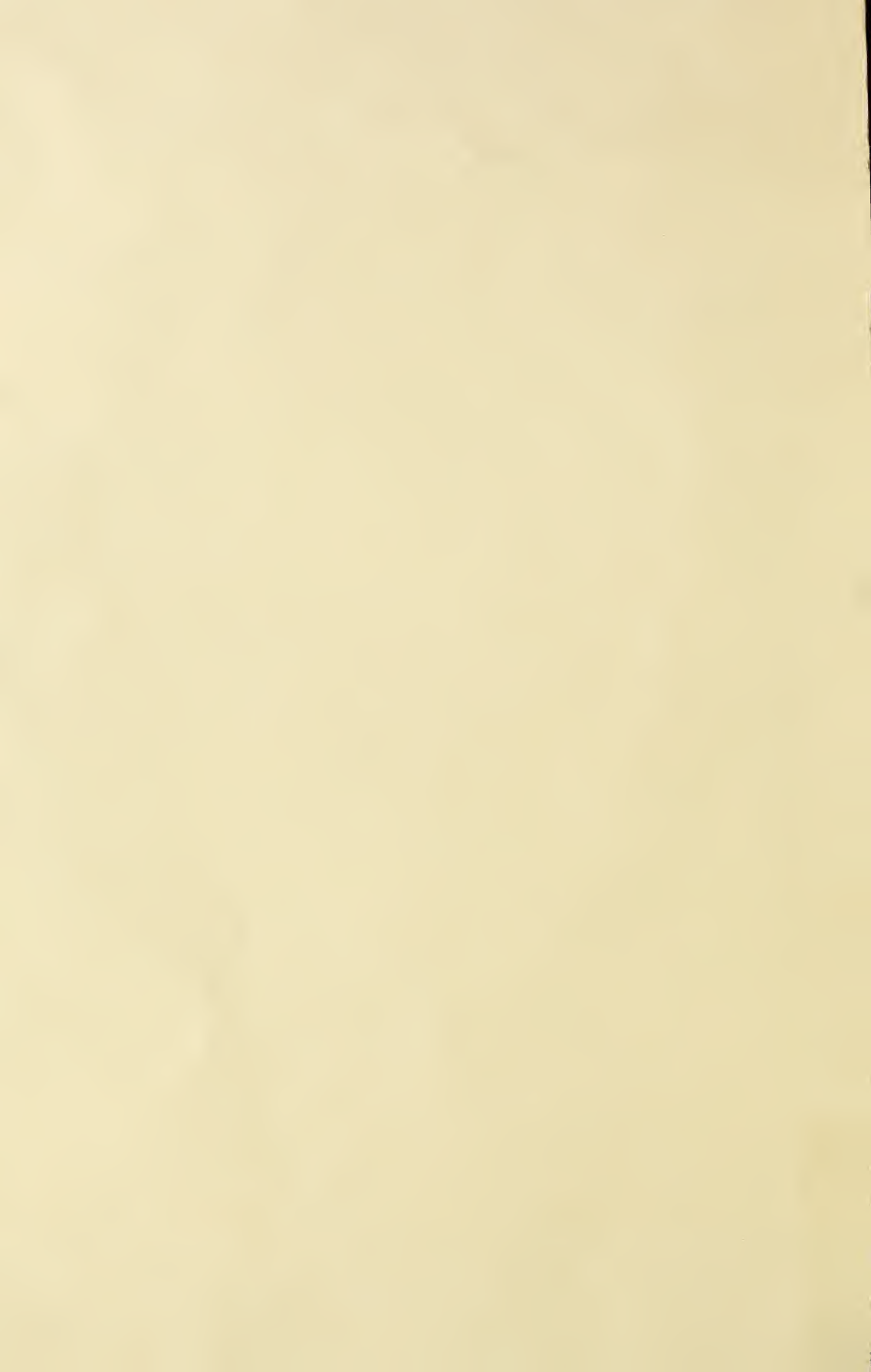


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In our last issue there appeared two articles for which, by some mistake, the writers were not given credit. The article entitled, "The Tuberculin Test for Tuberculosis in Milch Cows," was written by Professor D. S. White. The article entitled "Agricultural Training at the Ohio State University" was by Professor Thos. F. Hunt. We hope the gentlemen will receive our apologies for our carelessness in the matter.

The Ohio State University seems to lead in the number and kinds of clubs and societies which exist among the students. This University boasts of more institutions of the kind than any other school in the state. Every department has its club or seminar for the advanced study of the subjects which it includes. The number of clubs does not seem to be decreasing, but on the other hand is constantly increasing. Within the last few months have been founded the Wheaton club, for the study of birds, the Organic Evolution club, whose name is significant of its object, the Mathe-

matical club, the Ethical association, and others. The Agricultural Seminar was instituted during the latter part of the last school year. Its object is to study questions of general interest to agriculturists. The foundation of these clubs is an emphatic declaration that there is being an advancement in the subjects which they concern, and we may say without fear that only in this way can the requisite spirit and thoroughness be acquired. One may study long and hard upon a subject, but not until he is called upon to discuss it and run the gauntlet of the opinion of others will he acquire the full appreciation, the very essence of it. Thus we say, let the clubs increase in size and numbers and become more limited in the bounds of their discussions.

The members of the faculty of the College of Agriculture have been busy with their institute work, of which they have a good deal at this season of the year. Judging from the demand which exists for our professors and instructors among the institutes throughout the state, the people seem to be able to appreciate a good thing when they see it, and from the questions asked and answered, the knowledge of the speakers of their subjects seems to be much respected. The good that will come from such work both to the University and the speakers themselves is inestimable.

## Our New Secretary.

On March 4 the reins of this government changed from a Democrat to a Republican President, at which time Major McKinley, our honored statesman, was inaugurated into office as the chief executive of this nation for the next four years.

Since McKinley's election last November the eyes of the people were turned toward Canton and waited with anxiety to know who would be his cabinet advisers. The farmers of the country sent petitions and requests to the President-elect that an agriculturist and

not a politician be chosen for the important post of Secretary of Agriculture. The President is a warm friend of the farmer, and these requests were considered by him, and to our satisfaction on the morning of February 1st, The Daily Press announced that the portfolio of agriculture had been tendered Hon. Jas. Wilson, of Iowa, and by him accepted.

He was born in Ayrshire, Scotland, August 16, 1835, and with his parents immigrated to America when he was 16, and commenced farming at Norwich, Conn.

About 1850 the tide was beginning to carry many pioneers into the boundless and undeveloped West. In the fall of 1852 the family moved west and took up government land in Tama county, Iowa, and at once took up diversified farming. The dairy and feed-lot soon held a prominent place in the farm economy.

He attended the public schools and also Iowa College, but "graduated between the plow handles," where, as a boy, it was said of him that he could turn a furrow as straight as a line and repeat more than half of Burns' poems, or make a better speech on the political issues of the day than any other man in the county.

His ability was soon recognized and he was elected a member of the State Legislature for six years and Speaker of the House for two years. He was a member of the first Iowa Railroad Commission, to which he did credit as a farmer member.

We find him a member of the Forty-third, Forty-fourth and Forty-eighth Congresses, and rendered valuable service in the interests of agriculture and in securing congressional aid to stamp out pleuro-pneumonia in cattle was highly commended.

He has served as Trustee of the Iowa State University and of several other colleges of that state. In January, 1891, he was elected Director of the Iowa Experiment Station, and Professor of Agriculture in the Iowa Agricultural Col-

lege, which position he has filled since with credit until he assumed his duties as Secretary of Agriculture at Washington, D. C.

Our sister state of Iowa no doubt feels proud over this appointment, as that state outranks all others in the Union in the aggregate volume of agricultural produce grown within its borders. First in corn, first in hogs, first in cattle, her position in American agriculture is unquestioned.

No doubt by reason of her soil, location and climate, Iowa will remain the Keystone of the West. C. W. M.

### Col. J. H. Brigham.

Ohio comes to the front again and furnishes the Assistant Secretary of Agriculture in the person of Col. J. H. Brigham, Delta, O. This is another good choice, he being a man who has followed farming all his life and well knows the need of the farmer of today.

He was born at Lodi, Medina county, Ohio, December 12, 1838, and when 6 years old moved to a farm in that county. In 1852 he moved to Fulton county, in the northwestern part of the state, and remained there until 21 years old, teaching school and working on his father's farm. In the spring of 1860 he went to Warren county, O., to teach school, which occupation he followed until the breaking out of the civil war. On April 25, 1861, he enlisted as a private and remained in the service over four years. He returned at the close of the war with rank of Colonel of his regiment.

Immediately on his return home he again took up farming, and continued at the same until the present time. In 1873 he joined the Grange, and has been officially connected with the order ever since, and now holds the position of Master of the National Grange.

He served for several years as Trustee of the Ohio State University, and for some years as a member of the Board of Control of the State Experiment Station now located at Wooster. We find him



also a member of the State Board of Agriculture for six years, and President of the Board for one term.

From the political side, he has served as Sheriff of his county six years, and was a member of the State Senate one term, during which time he secured valuable legislation for the farmer, including the establishment of the Experiment Station. He was also a member of the Board of Control of the State Penitentiary one term.

We believe that the agriculture of the United States will move forward smoothly under his administration, as many things during the last four years were hard on the American farmer.

Messrs. Wilson and Brigham enter the work with the confidence and respect of the great body of the western and central farmers.

From what is known of their hopes and aims, there is no doubt that there is a bright promise of substantial help to the country from the agricultural department for the next four years.

C. W. M.

### **Glowing Tribute to the Work of Senator Morrill.**

At the unveiling of the bust of Senator Morrill, in the University Chapel on March 9, the following addresses were delivered. Prof. N. W. Lord spoke of the effect of the results of Senator Morrill's work concerning engineering, but he spoke extemporaneously to a large degree, and not having his notes at hand we are unable to reproduce his address.

#### **Captain Cope spoke as follows :**

In the program of this day's exercises, as originally announced, our highly respected and much beloved associate and coadjutor, Mr. Wing, whose absence from this platform all must regret, was to speak of Senator Justin S. Morrill and his great work, his text being "The Man and His Measures."

To me was assigned the task of speaking of the financial results of the legisla-

tion with which his honored name is so closely and enduringly identified.

To make my remarks intelligible, it becomes necessary to state briefly what that legislation is.

I should also speak of the movement towards a more practical education which the law providing for the Land Grant colleges was designed to promote, and Senator Morrill's part in such movement, but Professor Hurd, who will follow me, will do this far better than I can.

Let me say this, however, that in the minds of the wiser ones who took part in this movement, and especially in the mind of the great man whom we meet today to honor, there was no disposition to undervalue the higher culture. It was not to be excluded from their scheme of a more practical education, but was to go hand in hand with it. It was never considered that the two were antagonistic.

The first measure, known as the land grant act of 1862, was introduced into the lower house of congress by Mr. Morrill, then a representative from the state of Vermont, on the 14th of December, 1857.

It provided for a grant of land scrip to the several states and territories at the rate of 20,000 acres for each Senator and Representative in Congress, for the endowment of a college in each, to teach such branches of learning as are related to agriculture and the mechanic arts.

The bill was referred to the Committee on Public Lands, who delayed its report until April 15, 1858, and then reported against it.

After many delays the bill was finally passed, fourteen months after it was introduced, and on the 29th day of February, 1859, was vetoed by President Buchanan. The grounds for such veto were numerous; among them was one that, for the purposes of my remarks, is not without interest, as it shows that there was at least one high official who had some conception of the immense value of the grant. It was that the gift was so vast that it would tend to alienate the states from the general government.

Mr. Morrill made a very able and complete reply to this veto, but it was sustained, notwithstanding his efforts.

In December, 1891, he again introduced his bill, providing this time for a grant of 30,000 acres for each Senator and Representative, and it was again referred to the Committee on Public Lands. On the 29th of May, 1862, Mr. Potter, of Wisconsin, from said committee, made a report against it, and it was referred to the Committee of the Whole.

In the meantime, on the 2nd day of May, before the Committee of the Whole had reported adversely, Senator Benjamin F. Wade, of Ohio (you see no great measure can get through without the aid of some Ohio man), introduced into the Senate a bill of the same purport, which was referred to the Committee on Public Lands of that body. That committee reported the bill favorably, with slight amendments, on the 14th day of May, before the House Committee of the Whole had reported, and on the 10th day of June, it passed the Senate.

The next day it was sent to the House, and, on the 19th day of June, against the opposition of the Committee on Public Lands, was passed by a decisive vote.

On the second day of July, 1862, it was signed by Abraham Lincoln.

The act in substance provided a grant of 30,000 acres of land, or land scrip, to each state and territory for each of its Senators and Representatives in Congress it was entitled to under the census of 1860, for the endowment and support of at least one college, where the leading object should be, without excluding other scientific and classical studies and including military tactics, to reach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states might respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

The land scrip was granted to those states in which there were no public

lands subject to private entry at \$1.25 per acre.

In the states which had such lands, the lands themselves were granted. The states to which the land scrip was given were prohibited from locating it in other states or territories, but the assignees of such states could do so.

The land and scrip thus lavishly granted, amounted to 9,600,000 acres—an area larger than either of the states of Massachusetts, Vermont, New Hampshire or New Jersey—larger than the combined areas of Massachusetts, Connecticut and Rhode Island, and more than one-third as large as the state of Ohio.

What might not have been expected from such a munificent grant if it had been wisely managed?

From an official document, entitled, "The Public Domain," compiled by Mr. Thos. Donaldson, late of this city, and printed in 1884, we learn that this great body of land and land scrip was sold for an average price of 78½ cents an acre.

Some of the states were more fortunate than others, notably the state of New York. When the 990,000 acres of land scrip which it received were offered for sale, Ezra Cornell and Henry Sage took it at the market price, about 53 cents per acre, and paid for it, under a contract to locate it, and pay back to Cornell University all they received from it in excess of the purchase price and 6 per cent. interest thereon.

They located the scrip in some of the growing western states on lands which rapidly increased in value, and have paid back to Cornell University over \$7,000,000. But we are more interested in our own state.

The state of Ohio became entitled under this grant to 630,000 acres of land scrip, or to be accurate, 629,920 acres. Under the provisions of the act of Congress the state, before receiving the land, or scrip, was first required by its legislature to accept the provisions of the act, and pledge its faith to carry out such provisions.



It will doubtless be a matter of astonishment to those who are not familiar with the early history of the land grant colleges, to know that when the bill providing for the acceptance of this grant was first introduced into the legislature of Ohio, it was rejected. Such action so stirred the blood of that great old commoner, the Hon. Columbus Delano, of Mt. Vernon, Ohio, that in the fall of 1863 he became a candidate for the legislature, on the issue of the acceptance of the grant, and was triumphantly elected.

He, it was, who introduced and had passed on the 9th day of July, 1864, the act providing for the acceptance of the land scrip. Such action was duly certified to the Secretary of the Interior, and Governor John Brough, in his message of January, 1865, reported its receipt.

An act providing for its sale was passed on the 13th day of April thereafter. The act designated the Auditor, Treasurer and Secretary of State as Commissioners to effect such sale at a price not less than 80 cents per acre.

The Commissioners offered the scrip for sale, but only succeeded in selling 12,800 acres at that price. They reported their failure to dispose of the scrip to the legislature and recommended that the limit of 80 cents per acre be removed, which was done, and the whole of the remaining 617,160 acres was sold for an average price of about 53 cents per acre.

The amount realized therefrom was \$342,450.80, or, leaving off interest received on deferred payments, about \$340,000.

Soon after the Commissioners made their report there was wide dissatisfaction over the small sum realized, which led to the adoption by the legislature of a resolution calling on the Commissioners for a detailed report of their proceedings.

The Commissioners filed their report, and those who are curious to know who profited by the sale of the University's land scrip can ascertain the facts by consulting the report, which is printed in

one of the legislative journals. I have before me the list of purchasers, with the price paid.

Four hundred thousand acres of the scrip was sold to one G. T. Lewis, of Cleveland, at 53 cents per acre, under a contract whereby he was to dispose of the scrip and pay for it when he sold it.

After a lapse of thirty years, we look on this record with surprise. We do not know that anyone was to blame. The State Board of Agriculture was impatient to have a college endowed with the proceeds established as speedily as possible. The legislature seems to have seconded their wishes by enacting the law providing for an immediate sale.

The Commissioners who disposed of the scrip may have been technically correct in interpreting the law as a command to sell at once and at any price. But we see now what a lamentable mistake it was.

Alas! Ohio had no Ezra Cornell or Henry Sage to come forward, take the scrip, locate it, and give the institution to be endowed by it the benefit of the rapid increase in value of the lands so located.

It never occurred to our legislators or state officials that although the state could not locate the scrip outside of its own limits, the assignees of the state could do so. That a college could have been created and the scrip turned over to it, and that such college could have located it on lands which in a short time would have increased ten or perhaps twenty fold in value.

As it afterward transpired, not a dollar of the proceeds was needed for the purchase of the lands for a site, the erection of the buildings or for their equipment.

The institution was not ready for the reception of students until 1873, and if the lands had been wisely located and held until the proceeds were needed, the University would have had from the land grant a permanent endowment of perhaps \$5,000,000, and an income of \$300,000 per year.

To atone in part for the failure of the land grant of 1862 to provide adequately for the institutions of learning it was designed to promote, Senator Morrill in 1890 introduced and secured the passage of an act supplemental to the act of 1862, whereby an annual appropriation out of the proceeds of the public lands was made to each state for the further endowment of the colleges established under the said act. The act provided that such appropriation for the year 1890 should be \$15,000, and that it should be increased \$1,000 each year until it reached the sum of \$25,000, and annually thereafter the appropriation was to be \$25,000.

There is some danger that the public lands, out of which this appropriation is made, will at no distant day become exhausted, but there is good reason to hope that Congress will never abandon the colleges it has so generously aided in the past, nor permit their incomes to be diminished.

In spite of these disappointing financial results, the land grant colleges have done, and are doing a great and noble work, as you will hear from Professor Hurd and Dr. Scott. To the brave old statesman who was foremost in establishing them, and in providing for their continued support, and who, in a serene and beautiful old age, now sees the full fruition of his hopes, the very highest tribute of respect and honor is justly due

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Professor Scott spoke as follows of  
**THE RESULT OF THE LABORS OF  
 SENATOR MORRILL TO GENERAL  
 EDUCATION.**

I propose to answer two questions: First, what results to general education did Senator Morrill contemplate? Second: What results to general education has he achieved?

For an answer to the first question, let us turn to the land grant act of 1862, of which he was the real author and by which he sought to impress a definite

character of the college for whose existence it provided. The purpose of that act, according to its own language, was to establish in each state "at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts \* \* \* in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Observe, first, that these institutions were not to be schools or academies, but "colleges." This indicates at once that they were to have a high rank and scope equal to those of the highest grade of educational institutions then existing in the United States.

Observe, second, that these colleges were not to teach agriculture or mechanics as an art, but the sciences related to them.

Observe, third, the phrase "without excluding other scientific and classical studies." By some these words have been interpreted as if they made it optional whether these "other scientific and classical studies" should be admitted or not. By some they have been mentally eliminated; by others disregarded, even denied. But what can be plainer than that they are in the law, and that they are there for a purpose. These liberal studies are not to be "excluded."

Observe, fourth, that the law says that the aim shall be "the liberal and practical education of the industrial classes—not practical only, but liberal and practical." This phrase and the one just noticed unite in showing that the interest was not to supplant the existing and approved form of education given in the college, but to expand it; not to make it less general, but more general. The liberal education was to be retained, but now, in this new era, it was to be made practical by the addition of scientific studies. The system of education was to be reformed, but not by overturning all that the wit of man had wrought out by



centuries of experiment and thought. The reform was to be accomplished by supplying what it was believed was still lacking to make the system rounded and complete, at least for the industrial classes.

But observe, fifth, that the growth, even of the industrial classes are not to be limited to the "pursuits" of life. They are to be educated also, if they shall so elect, for "the several professions of life." They are to be fitted to enter any door of life that they may choose. But how can this be done unless a liberal as well as practical education be given. Surely, the whole tenor of the law proves that its purpose was not to narrow but to broaden; not to weaken, but to strengthen the existing courses of study.

But, besides the language of the law itself, which is too plain to be misunderstood, we have the interpretation of the distinguished author of the law, the venerable Senator Morrill himself.

He has often expressed himself on this point, and always to the same effect. In an address before the house committee on education of the legislature of Vermont, delivered October 24, 1890, he said:

"The object of the introduction of the bill in 1862 was to give a chance to the industrial classes of the country to obtain a liberal education, something more than what was bestowed by our universities and colleges in general." Again he says: "Now it seems that under the late act giving further endowment to these colleges, it is proposed to establish something that will amount to nothing more than an agricultural school for our state. I should regard that as a revolution and subversion of the whole idea of the land grant act of 1862, which was of a much broader kind, \* \* \* It was for the industrial classes to promote their instruction generally, and it was not to exclude even the classics."

It being thus shown how clearly general education was contemplated in the ground law of these colleges, our remain-

ing question is: What have they actually done for general education?

Sixty-three institutions have been established. Many of them have been organized according to the narrow and unwarranted interpretation of the law, and are technical institutions pure and simple. Nineteen, however, among which happily is our own, have adopted the broader theory. But even in these the intent of the law is not always strictly adhered to. They do not offer "a liberal and practical education," but a liberal and practical education blending the two elements in a harmonious and balanced whole, but an education of each kind, and the student is obliged to choose between them. Yet all of them, whatever their form, have done something to promote general education. Every institution points beyond itself. The existing state is but a station in the progress of humanity toward that perfect organization, the ideal state. The church is but a temporary form of the enduring kingdom of God, and declares plainly that she seeks another country, that is, a heavenly. The school, especially, is but a wayside inn, a place of refreshment and equipment on the journey of the individual toward his far-off but glorious destination. If it does its true office for him, it plants in his breast a beating hope, and lifts his eyes to lofty and gleaming heights, and puts into his hand "A banner with the strange device, Excelsior."

The agricultural college in its lowest terms, may, simply because it speaks in a familiar accent, waken some youth from their "dogmatic slumber;" and when they have needed its invitation and have entered its portals, it spreads before them a feast that surprises all their former thoughts and gives them a wine to drink sweeter, mellow, richer than their lips have ever known. Visions of a new and fairer world open before their eyes; and henceforth they can never be as they were before this new summons aroused them. One who climbs even a little way up, approaches the heavens.

Even a tallow candle throws out its radiance in all directions, so that whoever advances to it from any side enters a whole circle of illumination.

Some who have gone to these colleges for a year have stayed two years, some three years. Some have had their blood set in more rapid motion, and have felt the immortal craving for knowledge, for intellectual power, for fuller and larger life.

This is much oftener true where both technical and liberal education are offered in the same college. Many a student who has entered one of these institutions for a brief training in applied science or in technique of his chosen art has been raised into a new life. Light from a more spacious intellectual firmament has poured around him. A quickening warmth has played upon him and pervaded him. He has breathed an atmosphere electric with the enthusiasm of young thought and aspiration. How could he help the expansion and elevation of his mind? How could he help returning to his home to live on higher levels and shed around him the inspiring influence of his new-found being and aims? Life will always have a vaster meaning to him, and he will be a type in which others will, consciously or unconsciously, discern that meaning and "be changed into the same image."

But broader institution receives also a large number of students whom it trains in pure science and in the humanities—history and literature and philosophy. It opens the higher realms of thought. It lifts up ideals. It introduces the great masters of intellect, the supreme lights of literature, the gifted and glorious spirits of all time. It brings the student into closer relations with his fellow-men of different training and different habits of thought, and begets in him wider and and stronger sympathies. It endows him with a clearer insight and spreads before him a larger outlook. It anoints his eyes, and he beholds the air about him populous with angels and with the angels of God.

These nineteen colleges in which liberal and practical studies are both accorded a place, had in 1894-95 more than a thousand teachers and more than twelve thousand students, while the number of land grant colleges reported 17,280 students, of whom 12,358 were in the college department. That is to say, more than two-thirds of the students in these sixty-three colleges are in the nineteen, which are organized on the liberal basis, and these nineteen contain as many students as the other forty-four have in the college department.

In yet another way has the work of Senator Morrill produced a beneficial result on general education. The land grant act of 1862 has stimulated the private and denominational colleges to introduce a broader curriculum. The creation of the land grant colleges was a part of that strong movement which was abroad 40 and 50 years ago, and which had for its object the more adequate recognition of science in education, especially in higher education. At that time college courses were made up mainly of mathematics, languages and philosophy, with the elements of several natural sciences taught exclusively from text books; and usually by one man. Laboratories were almost unknown. Twenty-five years earlier even this modicum of science was not found. But a young giant had been born. As he grew and gathered strength, he felt himself constrained and began to struggle for liberty, for air and space. But his dimensions and his claims were so vast that those already in possession were afraid to admit him, lest he should turn upon them and drive them out. So the struggling Sampson was bound with new cords. He had succeeded in breaking only some of these one by one, when the land grant act of 1862 came to his rescue. It cut the cords and set him free. Institutions were established in which he could find room. The laboratory was installed. The applications of science to agriculture, to surveying, to building, to



machine construction, to mining, were given a place.

Note the result. Every other college has found it necessary, in order to maintain its rank and meet the public demand, to introduce science more and more extensively, to open laboratories, and to obtain an equipment of apparatus which our grandfathers could scarcely have dreamed of. In a word, all the colleges have felt compelled to do their utmost in providing for scientific and even technical education, in addition to the kind of education which they formerly gave. The heaven has spread to the whole mass. New breadth, new vigor, new life have been imparted to college training. Society is made richer and stronger. And, as the supreme result, the individual man has been endowed with a new sense of power and a new continent has been added to his intellectual domain.

All honor to the man to whom we are indebted for results so great and so beneficent!

### **Senator Morrill Idea and its Effect Upon Agriculture.**

Senator Morrill's father was a blacksmith. The son, looking around him at the educational institutions of the day, saw for the most part, the single type classical college whose students were fitted for the pulpit, the bar, or the forum. This education was designed to make orators—to make men whose influence was to be exerted through the spoken word. It was not designed to make Grants, Edisons, Pasteurs or Rockefeller. He found no college, or, at least very few, fitting young men to follow the great industries, the wealth-creating forces of the world. It should be observed that a larger proportion of the men of the world at the time when young Morrill worked at the forge with his father were occupied in those industries than at present time. Inconsistent as it may at first seem, the higher the development of the industries the less the per cent. of the people engaged in

them. Were the crops of 1897 upon the American farms to be harvested as in the time of George Washington, every able-bodied man of military age in the United States would be required to gather it. The self-binder has made it possible for men and women to devote their lives to art, music, and education, whose energies were formerly required to produce sufficient food and raiment for mankind. Growing two blades of grass where but one grew before has made it possible for men and women to spend the heated season performing in roof gardens of cities, whereas formerly the husband labored in the harvest field for some farmer at moderate wages, while the wife in the cabin hardby toiled to prepare a humble meal.

Senator Morrill pondered deeply upon this subject of industrial education, and whether he clearly foreshadowed the future or not, he realized fully the importance of an education to those who were to shape and carry forward the great industries of the world, and he saw clearly that in the nature of the case that if the industries of the country were to be touched effectively these institutions must be national in their scope and must be supported by national government and the state legislatures.

It would hardly be just to Senator Morrill to state that he alone was responsible for this great work. That in the midst of war that he alone should have brought to successful fruition such a stupendous provision for the arts of peace. The time was ripe. For nearly a quarter of a century the agitation for industrial education had been going on steadily. Among those who stood out prominently as promoters of this cause may be mentioned Pugh, of Pennsylvania, Turner, of Illinois, and our own Dr. Townsend. Turner, in the 40's, in the then western state of Illinois, had been championing the cause of industrial education most effectively. Pugh, of Pennsylvania, had studied in Germany, and was enthusiastically trying to spread the gospel of Von Liebig among the farmers



of the western hemisphere. Dr. Townshend, through his knowledge of medicine and his love of agriculture, with three other gentlemen, had been among the first to give instruction to young men in the sciences that relate to and in their relation to agriculture. All of them were men of most remarkable and fascinating personality and men who have left the world distinctly better for having lived in it.

The then Representative Justin S. Morrill put his ideas into force by preparing the co-called "Land Grant Act," which, after having been introduced three times and being once vetoed by President Buchanan, passed congress in its amended form nearly four years after its first introduction.

"President Lincoln," says Dr. True, "made the bill a law by affixing his signature July 2, 1862, the very day when McClellan's army began its retreat from the Peninsula after the bloody battle of Malvern Hill."

The oft-quoted clause of this act provides that each state shall receive certain moneys for "the endowment, support and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts \* \* \* in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

In the first place, this act creates a college. In 1862 the term college had a specific and well understood meaning. In 1862 a college was not an academy, a high school or a university. In the second place, this college was not created to teach necessarily either agriculture or mechanic arts. These institutions were created to teach certain branches of learning relating to agriculture and the mechanic arts in order to promote the liberal and practical education of the industrial classes.

Whatsoever promotes the liberal and

practical education of the industrial classes is to be taught. It is not the subjects which are to be taught that are specified; that is left to the judgment, good or bad, of the trustees and faculty of the several institutions. It is the purpose with which the subjects are taught that is specified, and that purpose is to promote the liberal and practical education of the industrial classes.

In 1890, the now venerable Senator Morrill introduced the so-called "Morrill Act," which further endowed these institutions.

This act states that the money is to be applied only to instruction in agriculture, the mechanic arts, the English language, the various branches of mathematical, physical, natural and economic sciences, with special reference to their application to the industries of life. This bill does what the first one did not do; it specifically asserts that agriculture and the mechanic arts are to be taught, and it reasserts that English and the various sciences are to be taught with special reference to their application to the industries of life. Did this national legislation contemplate the widest possible educational institutions? Not at all. It was not intended to establish another Yale in Connecticut, or another Harvard in Massachusetts, or another Princeton in New Jersey, or another Dartmouth in Maine. It did contemplate establishing broad educational institutions for a specific purpose in every state in the Union.

Lest I should be misunderstood in presenting to you Senator Morrill's idea as I understand it, let me say that there can be no possible objection to the people of any state supplementing through its state legislature the benefactions of the national government in such a way as to broaden the horizon of these educational institutions as has been done in Ohio. There need be no real objection to the establishment in each state of the union, through the combined action of national and state legislation, of such an institution of learning as Ezra Cornell had in

mind when he said: "I would found an institution where any person can find instruction in any study." Such an institution is not necessarily higher, but it is certainly broader and may be better—better because it satisfies the needs, the hopes, the aspirations of more people.

There is not time to give in detail the effect of this legislation upon that branch of education in which I am peculiarly interested, viz., technical training in agriculture.

The establishment of the land grant college founded for the first time colleges for technical training in agriculture in America. In Michigan, Pennsylvania, Maryland and possibly other states there were high schools or schools of similar grade for technical training in agriculture, but this bill established a college in every state in the union for such training. As a result of this and subsequent acts, a training in agriculture and related subjects can be obtained in forty-six states and in sixty institutions of learning. I am indebted to the year book of the U. S. Department of Agriculture, for the information that there were 3847 students in the courses in agriculture of these institutions in 1894 and that in the same year there were 229 graduates from those courses, while the total number of graduates in those courses since the establishment of the colleges is 3003. Without this legislation it is safe to say very little college training could be had on this subject. Training in technical agriculture is yet very new; it is confessedly crude and in many cases ineffectually accomplished; yet the agricultural departments of our state educational institutions in connection with the allied experiment stations are exerting a wide influence upon the interests which they represent. The agricultural press, through its editors and its correspondents, are largely guided and modified by their influence. And the individual farmer is coming more and more to look to these institutions for help and guidance.

But it is not in the development of technical training in agriculture that

these institutions have made the largest progress in the interest of the farmer. It is in the development of those sciences upon whose knowledge a rational system of agriculture is possible that these colleges have been the most helpful. Without a knowledge of chemistry, geology, botany, physiology, bacteriology and entomology, no rational system of agriculture could be developed.

The act of 1862 did not, of course, create these sciences. It did not in the first instance indicate their importance to agriculture. With the classic investigations of Von Liebig, Boussegault and Sir Humphrey Davy began those rational explanations of the laws of animal and plant growth that made a college of agriculture comprehensible. Although half a century has elapsed, such a college is still incomprehensible to many people. Although they were not created by it, the wonderful development of these sciences, especially in their economic aspect, has been the result of the act of the national government establishing state institutions of learning.

The economist sometimes divides the industries of the world into three great classes, agriculture, manufacturing and transportation, which latter includes merchandising. We have our ministers, teachers, lawyers, doctors, our waiters and our servants.

This highly respected class is but the servitor of the three great classes of agriculture, manufacturing and transportation. This servant class is highly influential because it is for the most part a highly educated class, but after all it constitutes but a small portion of mankind. The energies of mankind are largely consumed by the three great industrial classes, forty per cent. of the people of this country being of the agricultural class alone.

Of these three industrial classes, agriculture has been the most backward in development. A rational system of agriculture is scarcely half a century old; improvement in mechanics began before Columbus discovered America. Why?



Because civilization, like our rivers, flows along the lines of least resistance. The elementary laws of physics are easier to collate than the elementary laws of life. Did you ever stop to think that of the three great industries, agriculture, manufacturing and transportation, agriculture alone deals with living things? Agriculture cannot be brought to the exactness of mechanics, because it is not based upon physical laws, but because it is fundamentally based upon life. Agriculture cannot be brought to its highest development until we know all about life,—and that day is probably far distant,—but the progress of the sciences of chemistry and biology bring us much hope for the future.

The thought I am trying to impress is well illustrated by the clover plant which the farmer for nearly 300 years has recognized as a beneficent plant, yet until ten years ago no man ever dreamed of the true reason why the clover plant was so beneficial to agriculture. It is now well known that the tubercles which grow upon the roots of the clover and similar plants contain innumerable bacteria, whose function is to convert the inert nitrogen of the air into plant food. The farmer pays three times as much per pound for these nitrates in commercial fertilizers as the householder pays for granulated sugar, while over each acre of his land rests a sea of inert nitrogen which these minute organisms help to make available. Why has this fact only recently been discovered? For the simple reason that until recently we have not had microscopes powerful enough to see these bacteria. Do you not see there is waiting for agriculture with our increasing knowledge of those sciences which have for their basis the laws of life, a development beyond the fondest hopes of the wildest enthusiast? Agriculture is but at the threshold of its development. "Benjamin was the youngest son."

Many cultured men recommend a college education as of more value to a farmer than the current agricultural newspaper; others value the agricultural papers the highest. But be this as it may, anyone can get almost a complete education in agriculture by taking the *Rural New Yorker* and the *Agricultural Student*, both of which will be sent postpaid for the small sum of \$1.10.

## AGRICULTURAL STUDENT UNION

### A Brief Review of the Work for 1896 and the Outlook for 1897—Suggestions to Experimenters.

BY DIRECTORS BLOOMFIELD AND HINE.

#### Agricultural Division.

The response to Circular Letter No. 1, issued by the Secretary, was most gratifying and resulted in the placing of nearly one hundred names of ex-students of the University and prominent farmers who signified a desire to assist in the work of the Union, upon the address list of the Agricultural Division. Many encouraging letters were also received, some of them containing suggestions as to the work which should first engage our attention. Tabulations of the answers to the questions sent out to correspondents have been made and are particularly interesting.

Forty-two persons answered the questions in regard to the oat crop. Twenty-two different varieties of oats were mentioned as being grown, and twenty-eight made reply to the question in regard to the use of the commercial fertilizers, thirteen saying that they used them on this crop. In answer to the questions in regard to the corn crop, seventy persons made reply, naming thirty-five varieties, with as many more local varieties without names. Twenty replied that commercial fertilizers were used by them on the corn crop.

In reply to the questions in regard to the growing of soiling and catch crops, fifty-seven said that they had or contem-



plated growing some, one or more, of this class of farm crop. Thirteen mentioned sweet corn, six sorghum, eight peas, three rape, seven clover and three alfalfa as being the particular crop they intended to grow. Out of fifty-five persons replying to the questions in regard to commercial fertilizers, forty-six replied that they used them regularly on one or more crops. Of thirty-two persons replying to the question, "With what success have you used commercial fertilizers?" twenty-six replied with good success, three variable or fair, and three no results. Twenty-one replied that they had or contemplated trying home mixing of fertilizers.

Twenty-two persons replied that they were interested in breeding and feeding some class of live stock.

The Union was very fortunate in securing the co-operation of the Ohio Agricultural Experiment Station at the beginning of the work. There were sent out from the station forty-four sets of six sacks each of the fertilizers; also, two varieties of corn to fifty-six addresses, and two varieties of oats to twenty-eight addresses. In all, there were over four hundred packages, representing a considerable outlay by the station in actual cost of fertilizers, seeds, sacks to place them in, as well as labor in preparing them for shipment to the experimenters. On account of unavoidable delays in securing fertilizers, and the time required to prepare the packages for shipment, the seeds were not sent out until April 9, and the fertilizers on May 6. They therefore did not reach many until after all spring crops had been planted or until other arrangements had been made in regard to the fields. From these causes and also partly on account of the unfavorable season for crops in general, a comparatively small number of reports have been made. Every effort will be made to account for each package sent out before the final result of the year's work is published.

The full details of all experiments made will be published in the form of a special bulletin by the Ohio Agricultural Experiment Station, and will reach all members of the Union in due time.

Ten experimenters have to date reported the results of their work with the sets of fertilizers sent out upon the corn crop. These involved 105 plots, the number of plots in the individual experiments ranging from seven to twenty. There were in all thirty-nine unfertilized plots for comparison, five plots with barnyard manure, and four plots upon which various brands of commercial goods were used. Three experimenters reported the weights of stover as well as the yields of corn. The number of unfertilized plots in the individual experiments ranged from one to eleven. In several experiments the results are of little value either because of great irregularities in the soil or from faulty arrangement of the plots. We may expect that the experience gained by the past year's work will largely reduce the number of reports of this character in the future. The table given below exhibits some of the anomalies not unfrequently present in work of this character. Care should always be taken to include a sufficient number of "nothing" plots, every other plot, or at least every fourth one should be of this character.

The primary object of the series of fertilizer tests is to show the effect of various combinations of nitrogen, phosphoric acid and potash, and whether anyone of these may be omitted without detriment to the crop and also incidentally to study the effects produced by the various combinations on different crops and soils.

The following table exhibits the results of the past year's work upon corn. It will be seen that an increase of the potash ration had no effect upon the yield of grain or stover, but that an increase in the amount of phosphoric acid caused in general a very considerable increase. The decrease of ammonia had apparently but little effect:

Fertilizer Experiments on Corn by the Agricultural Students' Union in Co-operation with the Ohio Agricultural Experiment Station.

Fertilizer Experiments on Corn by the Agricultural Students' Union in Co-operation with the Ohio Agricultural Experiment Station.														
NUMBER OF SACK.	ANALYSIS OF FERTILIZERS.			INCREASE OR DECREASE (—) IN BUS. PER ACRE FROM THE APPLICATION OF THE FERTILIZERS AT THE RATE OF 300 LBS. PER A. GRAIN								INCREASE OR DECREASE (—) IN LBS. PER ACRE O X STOVER.		
	Phosphoric Acid. Per cent.	Ammonia Per cent.	Potash. Per cent.	Exp. No. 1.	Exp. No. 3.	Exp. No. 4.	Exp. No. 5.	Exp. No. 6.	Exp. No. 7.	Exp. No. 9.	Exp. No. 5.	Exp. No. 6.	Exp. No. 7.	
1	8½	5½	3½	5.8	1.6	—0.6	4.4	3.4	9.0	10.0	134	193	107	
2	8½	5½	6½	1.4	—5.0	—0.4	2.7	1.6	5.3	14.3	247	55	598	
3	8½	5½	10	—7	1.6	—5.8	7.5	3.8	8.6	2.9	90	78	567	
4	8½	2½	13½	5.5	—6.6	2.9	4.0	0.6	10.7	4.3	210	140	274	
5	12¾	2½	3½	11.4	3.1	—2.9	21.0	5.1	18.3	7.1	330	128	1057	
6	8½	5½	.....	3.1	—4.0	—1.8	11.0	6.4	—1.7	7.1	180	278	340	
Barnyard Manure Plots.	.....	.....	.....	10.5	1.0	4.8	10.5	8.4	.....	.....	230	248	.....	
Commercial Brands.	10	3	1	.....	.....	.....	.....	.....	11.4	.....	.....	.....	200	
	13	1½	2½	.....	.....	.....	6.0	.....	.....	.....	20	.....	.....	
	9	.....	1½	.....	.....	.....	7.0	.....	.....	.....	150	.....	.....	

A cordial invitation will be extended to all experimenters of last year to continue the tests the coming season on the same general plan. Experience in the work will create an interest, interest will bring greater attention to the details, thus insuring greater accuracy in the rement will certainly bring more definite

ments will certainly bring more definite knowledge concerning the correct composition of fertilizers, and critical studies of the individual experiments will be the means of obtaining more definite information in regard to the needs of particular plants and soils and also the effect of influences prevailing in the various experiments.

A few reports of variety tests upon corn have been received, but most of these tests are of little value for purposes of comparison, the yields being very irregular and the stand of corn poor or partly destroyed in some cases. The general opinion of those reporting is that the Leaming corn is too late in ripening in the northern part of the state, but that on good soil with early planting and a long season it is a very desirable variety.

Mr. J. G. Laughlin, of Cawtawba, Clark Co., reports an experiment with Clarage, Leaming and Red River. The yield on equal areas was:

Leaming—1,200 pounds sound corn and 71 pounds of soft corn.

Clarage—430 pounds of sound corn and 325 pounds of soft corn.

Red River—750 pounds of sound corn and 350 pounds of soft corn.

He reports that had the season been favorable, the probable yield of the Leaming would have been 105 bushels per acre, Clarage 45, and Red River 90.

Mr. A. H. Gladding, of Windsor, Ashtabula county, reports a test of Leaming and Clarage upon a light soil badly run, but fertilized with 300 pounds of superphosphate per acre. The yields upon one-fourth acre plots was: Leaming 27 bushels of sound corn and 2 pounds of soft. Clarage 20 bushels of sound corn and 1.6 pounds of soft corn.

In a test conducted by Mr. A. D. Spellman, of West Williamsfield, Ashtabula county, the following yields were obtained per acre:

Leaming—6,300 pounds of sound corn and 60 pounds of soft.

Clarage—4,090 pounds of sound corn and 50 pounds of soft.



King of Earlies—3,120 pounds of sound corn and 4 pounds of soft.

Three persons report concerning the varieties of oats, but only to say that the plots were nearly completely ruined by heavy rains or floods. Two report the successful treatment of seed oats for smut.

While the Union will not be prepared this spring to distribute varieties of seeds for testing, it is to be desired that work of this character be continued, and reports made to the Union upon such test. Such tests should be made in comparison with local varieties; the results will often be of great value in the community in which they are made. As an example,

Through the kindness of members of the result of a test this year by the writer may be cited.

the Union samples of two local varieties of corn were sent to my own farm for testing. One variety seems to be very much superior to the local variety largely grown in the neighborhood, and several farmers have expressed a desire to secure seed for planting this spring.

An exchange of varieties of seed might be effected through the medium of the Union, and I would be pleased to receive contributions from any members for this purpose.

L. M. BLOOMFIELD,  
Agricultural Director.

### Horticultural Division.

During the winter of 1894-95, the same year that the Agricultural Student made its appearance, the desirability of a "co-operative experimental association in Ohio" became apparent. Such an association had been formed by agricultural students living in the province of Ontario, Canada, and the work accomplished by it received the respect of the prominent agriculturists of the country at large.

Why should not such an organization exist in Ohio, one of the foremost agricultural states in the Union? And what organization is better prepared to take

charge of experiments than the association of agricultural students of the Ohio State University?

An article appeared in the Agricultural Student for February, 1895, giving reasons why such an organization should exist, and set forth its usefulness, influence and value, so far as could be anticipated at the time. Soon after this a committee was appointed to draw up a constitution, and on the 25th of March an organization was formed and christened the Agricultural Student Union of Ohio. The first year's work was undertaken with many obstacles in the way, and before all was in readiness it was late in the season; consequently not many experiments were attempted. A short report of the season's work was published in this periodical for March, 1896.

In the spring of '96 we took hold of the work in earnest. The University made an appropriation for this purpose, and through Mr. Bloomfield, the agricultural director, the experiment station furnished a number of sets of fertilizers for potatoes. Each experimenter received a full set of six mixtures of the following composition:

	Phos. acid	Ammonia	Potash
	p. ct.	p. ct.	p. ct.
I.	8½	5⅓	3⅓
II.	8½	5⅓	6⅓
III.	8½	5⅓	10
IV.	8½	2⅔	3⅓
V.	12¾	2⅔	3⅓
VI.	8½	5⅓	0

Each mixture was furnished in sufficient quantity for 1-20 acre plots. Besides the experiments with fertilizers on potatoes, members were asked to select one or more subjects for investigation from a list which included the following:

1. Treating seed potatoes with corrosive sublimate and Bordeaux mixture to prevent scab.
2. Mulching fruit trees.
3. Spraying gooseberries with Potassium sulphide to prevent mildew.



"Twenty-eight members indicated a willingness to take part in the work, and each chose from one to four of the subjects.

The extremely wet season, fungous diseases and insects have had their influences, and perhaps other valid causes might be given. At any rate, we have not received reports from more than half of those who promised to aid in the work.

There is not room in this article for a full report of the work of the past year, but a few quotations from some of the individual reports may be introduced here.

James Bogue, of Orwell, Ohio, had the following yields from 1-20 acre plats:

No. of Plat.	Fertilizer.	Lbs. Potatoes.
1	1	634
2	2	616
3	3	616
4	4	514
5	5	616
6	6	474
7	Unfertilized	422
8	Unfertilized	416

The composition of the fertilizers corresponding to the numbers is given above:

Mr. Kraver, of Windfall, Medina county, reports his yield as follows:

Plat No.	Fertilizer.	Yield.
1 (Top dressed with fine ( Barnyard manure. )		686
2	1	472
3	2	558
4	3	470
5	Unfertilized	315

The work for the coming year will be a duplication of last year's undertakings. We must take this opportunity to urge upon those who carry on experiments for the Union to use all possible caution in preventing small mistakes from creeping into their work; as pennies make the dollars, it is the small items that the most seriously misleading in experimental work.

The Experiment Station and Univer-

sity authorities are worthy of our most hearty thanks for material and funds which made it possible to carry on this work so satisfactorily.

JAMES S. HINE.  
Horticultural Director.

Corn (*Zea Mays*) is one of the most widely known of forage crops in this country. It is so plentiful and so easily grown that we are prone to underestimate its true feeding value. Especially is this true of the stover (the stalks, leaves and husks). It is really surprising how many farmers there are who feed their stover under wasteful conditions. There seem to be a great many farmers through the great corn belt and elsewhere who do not seem to realize the value of corn stover as a feed for cattle. It is considered as a by-product to be gotten rid of as soon as may be, and many consider the bare stalks—minus the blades and husks—as worthless for feed as so many sticks. Many of them pass through the field, taking only the ears, leaving the stalks standing, and then turn the cattle into the field to eat the leaves. They thus trample the stalks down and waste more than half the real food value of the crop. These same farmers feed out tons and tons of hay to their stock during the winter which might have been saved and brought good prices had they properly harvested and cared for their stover, and fed it instead of hay. It has been clearly proven by experiment that the ears and blades of the corn contain only about 50 per cent. of the dry matter of the crop. Hence it will be seen that the parts neglected by the farmers contain fully one-half of the dry matter. Of the total digestible matter the leaves and ears contain only about 55 per cent.; then about 45 per cent., or nearly half of the actual feed, is contained in the stalks. Of course, cattle will not eat the stalks to any great extent unless they are cut up; but when they are cut into lengths of say one-half inch and fed with a grain feed, rich in

protein, good results may be obtained with horses, cattle or sheep.

Experiments show that corn stover properly handled has a slightly greater feeding value than timothy hay. But the value of stover as a feed depends largely on the conditions surrounding it while curing and on its care afterwards. It is a fact well recognized by all farmers that if hay becomes wet during the process of curing, it loses much of its feeding value, and hence great care is exercised to prevent this. While, on the other hand, they often shock their corn in small, loose shocks and allow it to stand out subject to the vicissitudes of the weather for several months. True, the stover is not affected so readily or in the same manner by the rain as is hay, for, in the case of the hay, as is well known, the soluble mineral salts are dissolved out, while in the corn stover the carbon-hydrates (sugar gum fiber) are the substances affected.

The water does not affect these bodies directly, but acts indirectly by aiding or causing fermentation, which changes the sugar to acids, mainly acetic acid.

It has been determined by actual experiment that corn stover may, by being exposed, lose as high as 50 per cent. of the dry matter. When cured in a proper manner the loss by curing is about 14 per cent. on the average of the total dry matter of the crop.

The stover contains the largest amount of dry matter in the mature stage, and as the dry matter is what counts as food, it would be natural to infer that this would be the best stage at which to harvest to secure the largest amount of feed. But, if it is allowed to reach the mature stage, hard, woody substances are developed in the tissue, which are probably indigestible. The early German digestion experiments tend to show that the digestibility decreases as the plant grows older, and the experiments made along this line in our own country seem to corroborate this.

There have been quite a number of experiments run to determine the proper

time to cut corn fodder, and the general trend of these experiments seem to show that the largest amount of digestible nutrients are obtained by cutting while in the medium mature stage. At this stage the leaves are beginning to dry, the husks are green, and the kernels mostly dented.

In this country there are several methods of preparing stover for feeding, among which may be mentioned cutting, shredding and ensiling. Cutting is one of the oldest of these methods in general use. It is a method with which all are acquainted and needs no further discussion here. Before the silo came into general use, many dairymen prepared this cut stover for feeding by placing a quantity of it into a large water tight box, and mixing it up with ground feed, and then pouring a quantity of water over the whole mass sufficient to thoroughly dampen it; the box was then covered and allowed to stand for about twenty-four hours, during which time the mixture would pass through a process of fermentation, which softened up the hard parts of the stalks and rendered them more palatable. In this way, their animals would consume a large quantity and eat the stover up much cleaner than when dry. Some dairymen who run on a small scale and have no silo, still practice this method of feeding stover.

Although shredding is a comparatively new process of preparing stover for winter use, there are few farmers who have not had some experience with it already. The first year that the shredding machines were used to any great extent, the results were not generally satisfactory, owing to the fact that the stover spoiled in the mow. But, since the machines have been improved and now removes the shelled corn from the stover it seems to keep better, and there is much less complaint than formerly. If the stover can be kept from moulding this method of preparing it is to be advocated, as it is much more convenient to handle, may be baled for market and the stock seem to eat it better.



The process of ensiling will be discussed in the next issue. M. I.

### Poultry Points.

An egg contains a large quantity of albumen. This albumen must come through the food fed to the hen.

Therefore, you cannot expect your hens to lay unless you supply this compound.

Green bone, ground up, together with the adhering flesh, forms one of the best foods for this purpose. Your hens produce a large amount of comparatively pure lime in the form of egg shells. They usually do not get this from any visible supply. You do not see it lying about for them to pick up. But you often notice that the shells are thin and occasionally absent. The invisible supply is not large enough and should be increased. Feeding the green cut bone will do this, or you can use cracked oyster shell. We find it convenient to keep oyster shell, in little boxes, in the pens at all times.

A hen swallows everything whole; her teeth are in her stomach, and to a certain extent are being changed as often as the food which passes through. In other words, they are artificial, and consist of grit, gravel, etc. Many make a mistake in failing to provide a supply of gravel for their chickens. It is surprising what an amount they will use.

An egg contains everything necessary for the formation of a chick.

Therefore, what better food for young chicks than eggs. Use a tester, whether using hens or incubators, and on the sixth or seventh day test out all unfertilized eggs, and keep them to feed those that hatch, instead of allowing them to remain until the close of the hatch and then throwing them away. There is always a per cent., more or less, of these unfertilized eggs, and the testing process is very simple. Any box in which you can put a light will do. The egg held up to a hole in the box will appear clear if unfertilized.

A course of instruction in Poultry Keeping is offered at the University Extension College, Reading, Eng. Term begins March 25, 1897.

### ADVICE TO FARMERS.

#### How to Market their Crops to the Best Advantage.



President McKinley has selected for his Secretary of Agriculture a farmer. Not a silk stocking farmer either. A man who was a pioneer on Iowa soil. A man who went barefooted to school in cold weather when a boy. By his own clear-headed work, coupled with economy and industry, he became the possessor of over 1,000 acres of Iowa land. Under his personal direction, his head work, this great farm is improved as perhaps no other farm in the State of Iowa. James Wilson, of Tama county, Io., as the head of agricultural affairs in the United States for the next four years, will do something for farmers. They need a sincere friend at Washington and they will have one. Mr. Wilson believes in newspapers. He believes in the people. For years he has given his views to the farmers of every county in Iowa through a "farm department" in the country papers. The new secretary is of the old Scotch Presbyterian school and no amount of flummery and style at Washington will cause him to forget that he is simply the "head farmer of the United States," and that he is in power for the purpose of helping the producers in every way possible. The "Farmer" house desires to call attention to another thing. The great farm of James Wilson is now conducted by his two sons, Ward and Peter. These young men have thinking heads on their shoulders and they are well known at the Union Stock Yards in this city, where they attend to the sales of live stock from the great



farm; they are known on the Chicago Board of Trade, for they market grain as they do live stock, by putting it on the biggest market on earth, where hundreds of buyers make the prices. Farmers, is there anything here to set us to thinking? Is it not the thinking farmer who succeeds? Are there other old and successful farmers in Iowa, in Illinois, in all of the big, banner states tributary to Chicago who are stepping out of the harness and leaving the management to their sons? These pioneers had virgin soil and "war prices" to help them pay for the land. Young men of today have the lowest prices recorded in the history of American farming. They must adopt new tactics. H. H. Carr & Co. say to all such young men, do not depend altogether on your ability to get up early, to work hard for sixteen hours a day; the odds are against you. Your back and legs and arms will do their share, and God never let a man live who was "too good" to use his muscles in working the soil, but give your head a chance. Do more planning so your hard work will count. Save, where your father years ago could afford to divide. The whole farming world has been depending on middlemen to take the grain from their farms off their hands. The middleman does it gladly; then he builds him an elevator, builds a fine house in town, buys a farm or two and perhaps opens a private bank in the village, all in about ten years, all out of money from farmers' grain. All he did was to buy it as cheap as possible from the men who raised the crops and then put it on the Chicago market for as good figure as possible. Farmers, do this yourselves. It is a paying business; it is your grain; the railroad will do for you what it does for the professional shipper. The open Chicago market is yours. The "farmer" commission house is yours to command. It is ready with advice, with details of how to ship, with daily reports of prices and ready to put your case before the railroad officials if the home agent, through interest in the shipper at the station, at-

tempts to block the direct farmer shipments. Figure what per cent. the shippers' profits are on your farm price and stop "selling on shares." The very low prices demand that you seek intelligent relief. H. H. Carr & Co. offer you the way to save two or four cents a bushel on all you raise by putting it on the Chicago market for you. Remember we do not buy anything ourselves. We make the buyers of the world pay as high as we can for the farmer's grain. This is good to think about. It is better to act upon. Respectfully yours,

H. H. CARR & CO.,

The Farmer Commission House, 94  
Board of Trade Bldg., Chicago.

### Meat Meal vs. Fresh Ground Bone.

It is impossible to state the comparative value, for so much depends upon the condition of the bones. If there is much fresh meat clinging to the bones and the bones are filled with marrow, the bones are of much greater value than they would otherwise be. Taking them as they run, I should say that meat meal would be considerably the more valuable.—H. S. Babcock.

We consider fresh ground green bone ten times better than scraps or meat meal, as it is often called. We eat our meat fresh; we do not buy "powdered beefsteak." We have had flocks of Brahmas that would leave from one-half to three-quarter of their morning mash—when mixed with scraps. Have taken away such leavings and placed another mash in its place, sometimes without meat and sometimes mixed with fresh cut bone, and the hens would dip into it eagerly, thereby fully convincing me that fresh cut bone was preferable to scraps. Cut bone should be fed twice or thrice a week—and not every day.—I. K. Felch & Son, Middlesex Co., Mass.

Twenty-five per cent. more eggs in a given time from fresh ground green bone than from meat meal.—W. M. Hughes, Newport Co., R. I.

The question is difficult to answer. Ground green bone is, I think, much

better than any of the prepared meat meals; there is, however, danger of feeding too much, unless cooked. There is no reason why bone meal, if fresh and properly prepared, should not be nearly if not quite as good as cooked green ground bone, but when it is prepared, dried and kept indefinitely, it undoubtedly depreciates. I have never analyzed any of the commercial bone meals and my remarks are therefore only formed by reason.—Ezra Cornell, Tompkins Co., N. Y.

Meat and ground fresh bone will induce laying in poultry; there is no doubt of that. While I am sure you cannot get more eggs in the life of the hens, you can hasten their work. You cannot get half the eggs fertilized for hatching, and the majority that are fertilized will hatch weak chickens; then again if you push the meat and ground fresh bone too hard, you are almost sure to soon sicken the stock, but a moderate feed twice a week, and grain at all other times, and a variety at that, will work all right and you can hatch eggs and keep your chickens in health. I use fresh ground bone twice a week and no meat meal—where I can give chickens range.—Sid Couger, Shelby Co., Ind.

No feeding experiments have been made here so as to indicate the relative value of these foods for laying hens. I do not know that their comparative value has been elsewhere determined. We have only the chemical analysis to judge from. According to a general estimate of the value of constituents, and without considering the relative digestibility, meat meal is worth from one-sixth to one-half more than an equal weight of fresh bone. The meat meal contains only about five per cent. of moisture, and is, therefore, more concentrated than the bone, which contains about 35 per cent. of water. The bone contains over 20 per cent. of fat, and the meat meal about 12 per cent. Substituting one of these foods for the other would change the composition of the ration, for the meal contains sometimes nearly twice as much

crude protein as the bone. The dry meal contains nearly twice as much of ash or mineral matter as the fresh bone, the larger part of this in each case being phosphate of lime.—Professor W. P. Wheeler, N. Y. Experiment Station.

## AGRICULTURE IN THE SCHOOLS

I would not ask that our schools be made schools of instruction in agriculture any more than in medicine or law, but we do need a primary instruction that will lead towards any calling or profession instead of away from some of them. As a scholar of the district school and a teacher in the same in younger days, I know from personal experience that much of the study was not in the direction of fitting myself or my pupils for farm practice.

Take, perhaps, an extreme illustration to show my meaning. I had three pupils, verging on to manhood, brothers, and sons of quite a wealthy farmer in the district. Their father was illiterate, but successful so far as money getting was concerned. I had counted the interest on many a note for him, and he, I suppose, thought his sons needed but little education, and so their school days were very intermittent, work days largely predominating. But the two older boys, knowing that their school days would entirely cease with that winter, were anxious to learn enough mathematics to compute interest. But they never reached those pages in their arithmetic, the framers of our course of study thinking it of greater importance to know how to reduce a complex fraction to a simple one or to know all about weighing the precious metals or measuring liquids, so the boys had a smattering to know what to do if they were in a jeweler's store or in an apothecary shop, but they to-day most likely get some one to count the interest on the money they have to loan.

I studied of many things that, except as an exercise of the mind, I have never found any use for on the farm nor in a pretty wide circle of business and duties



connected with it, and in general affairs of a citizen who likes to be connected with all of importance in his neighborhood. But how many things, the simple rudimentary principles, that might have been taught and so easily learned in those younger days when memory is so retentive and the mind so receptive, but they were not taught then, and except in general exercises, but little of them are taught yet, while our text-books are cumbered with much that never will be of any use to but one in a hundred.

All that the common schools should attempt is to give elementary instruction in such things every one should know, and attempt nothing that is in the line of any special calling nor that would lead away from any. Let special schools educate in special lines, and let our common schools be made, as they were intended, for all.

J. M. RICE.

Winview, Okla.

—Farm, Field and Fireside.

### Production of Broilers.

A correspondent of the Breeders' Gazette, who seems familiar with the subject, says that broilers reach usually the highest price in May. He adds:

"To have January and February broilers they must be hatched from eggs which command the highest price of all the year, and the chicks must be very carefully treated to grow them during that season; then only to be placed on the market in competition with an abundance of poultry and other meats of all kinds which are not selling high."

There is no doubt that producing young chickens in midwinter is an expensive business, when conducted on a large scale, and they would need to sell for a high price to leave as large net returns as those hatched in March. But as early as they can be reared without artificial heat, or serious loss, would seem to be the best season. The writer quoted, adds that they should not weigh over two pounds each dressed. If they do the price per pound is much reduced.

### Light and Eggs.

Light influences the laying on the part of the hens. Put a flock in a dimly-lighted poultry house, and no matter how comfortable it may be, fowls will cluster together in some corner outside and brave all the storms that may come in preference to remaining in a dark and cheerless abode. Chicks also prefer light and will remain outside of the brooder and become chilled rather than go under the cover where it is warm but dark. All birds have an instinctive dread of darkness. As soon as the sun begins to set they seek a safe retreat before darkness comes, and bright and early in the morning they go where it is light. The poultry house should have large windows. There are those who affirm that too much glass radiates the heat, but it also admits heat and light as well as rendering the interior of the house cheerful and inviting. As the hens will be more contented they will also be more thrifty, have better appetites, be less liable to disease and will produce more eggs during the winter.

### Potatoes for Hens.

Small potatoes are worth as much for feeding to poultry as the large tubers. The value of an article does not always depend on its market price, but on the use to which it may be applied. Hens are very partial to potatoes, and if the small ones are cooked and fed to them they can pick them to pieces without any other preparation. As winter food for ducks small potatoes are excellent. Separate them from the larger ones and store them in a convenient place where they can be easily handled when wanted for use.

### Weed them Out.

Weed out the flocks, dispensing of really old stock and the undesirable young. A few good hens, well cared for, will raise more chickens next summer than if a great flock is crowded together in unhealthy coops.



### Simple Tests of Productive Power.

A soil cannot be cultivated understandingly until it has been rigidly subjected to such examination as will tell us, as nearly as any examination can tell it, what is necessary to render it fertile. The mode of cultivation, the salts already contained in the earth, but especially the period, mode and form in which a manure is applied all combine in influencing its results.

A chemical analysis gives only what the soil contains at the moment of examination and not the quantity in which these constituents may be available to the plant in available form during the period of growth. But if it is desired to know whether a soil is already provided with nitrogenous matter it is sufficient to sow a handful of wheat upon a small square of ground which has been manured with a mineral substance only. Without the aid of nitrogenous matter the mineral matter has scarcely any effect upon wheat.

Therefore, if the small square of ground gives a rapid and healthy vegetation and a good crop, it shows that the earth had a sufficient supply of nitrogen, for the mineral manures contained no nitrogen.

On the other hand, to ascertain whether the soil contains a sufficiency of the mineral manure (phosphate of lime and an alkali, potash or soda), manure plots with nitrogenous substances only, planting one with corn and another with potatoes.

The great influence that phosphates of lime have on corn, sorghum and sugar cane and the alkalies on potatoes and tobacco, is well known; therefore, if the corn flourishes we may be sure the land has enough phosphate of lime, and if the potatoes flourish the land does not lack alkalies.

Thus, two experiments, requiring but a small area of ground and trying these different crops, are sufficient to obtain the indications necessary to a judicious system of culture.

The varied yield of these crops com-

pared with that obtained from land manured with nitrogenous and mineral substances combined will measure the richness of the soil. Since manures are the nourishing material of plants, and, other things being equal, the higher profit of the field depends only and alone on the greater easily extracted quantity of the same found in the soil; therefore, the more accurate knowledge of this substance, its proportions and use, and how it may be procured on a farm in sufficient quantity and with the least cost, is of great importance to the farmer who holds in his hands the threads of his own prosperity and the elements necessary to his own success; he possesses the compass by means of which his bark can be steered into port with flying colors, and this compass is his intimate knowledge of the soil he tills.

There is no one subject in agriculture which demands, at the present time, more care, continued and widely extended experiments than the practice of manuring.

ANDREW H. WARD.

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—Farm, Field and Fireside.

Apples that have been frozen often come out all right if thawed gradually, keeping them from the air until thawed. When thawed otherwise they become soft, but they make excellent cider, especially for apple butter or for jelly; and generally pressing alone is sufficient without grinding.

Tompkins King, which is a valuable apple along a narrow strip in about latitude 42 degrees, produced some fine specimens in Central Ohio last season, the first of any account for eight or ten years. Outside its peculiar limit it is a most unreliable fruit, yet some nurserymen keep on raising the trees and sending them out in sections where they can only be a disappointment. The thrifty growth of the tree pleases the eye of the buyer, who is often not informed as to the unreliability of the fruit.